USGS-NASA Landsat Science Team Membership

2012-2017

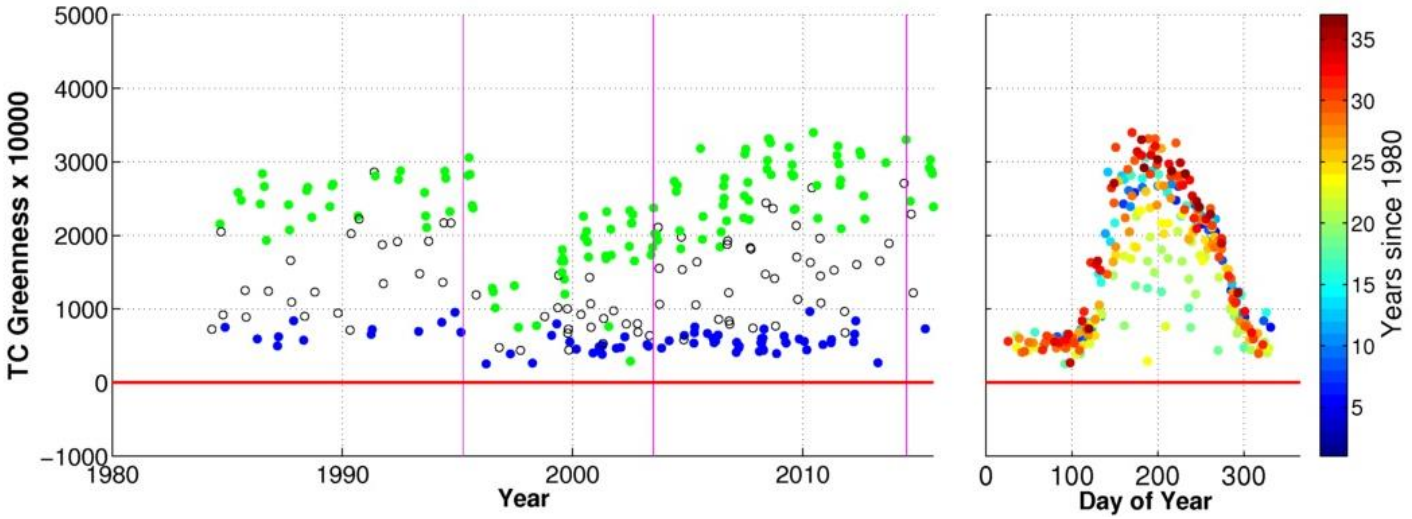
Landsat Science Team

- Chairs
  - Jim Irons, NASA GSFC
  - Tom Loveland, USGS EROS Center
- Team Leaders
  - David Roy, South Dakota State University
  - Curtis Woodcock, Boston University
- Membership – 21 academic, Federal, and international members

BOSTON UNIVERSITY

Better Use of the Landsat Temporal Domain: Monitoring Land Cover Type, Condition and Change

Dr. Curtis Woodcock, Dr. Mark Friedl & Dr. Pontus Olofsson



David Roy
Geospatial Sciences Center of Excellence
South Dakota State University

Global Long-Term Multi-Sensor Web-Enabled Landsat Data Record

USGS science for a changing world

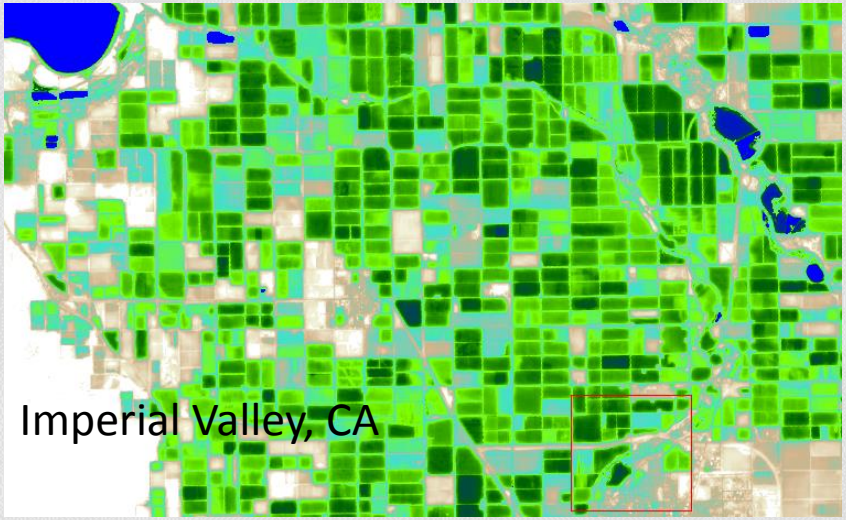
NASA

SDSU

Rick Allen

Professor of Water Resources Engineering

University of Idaho



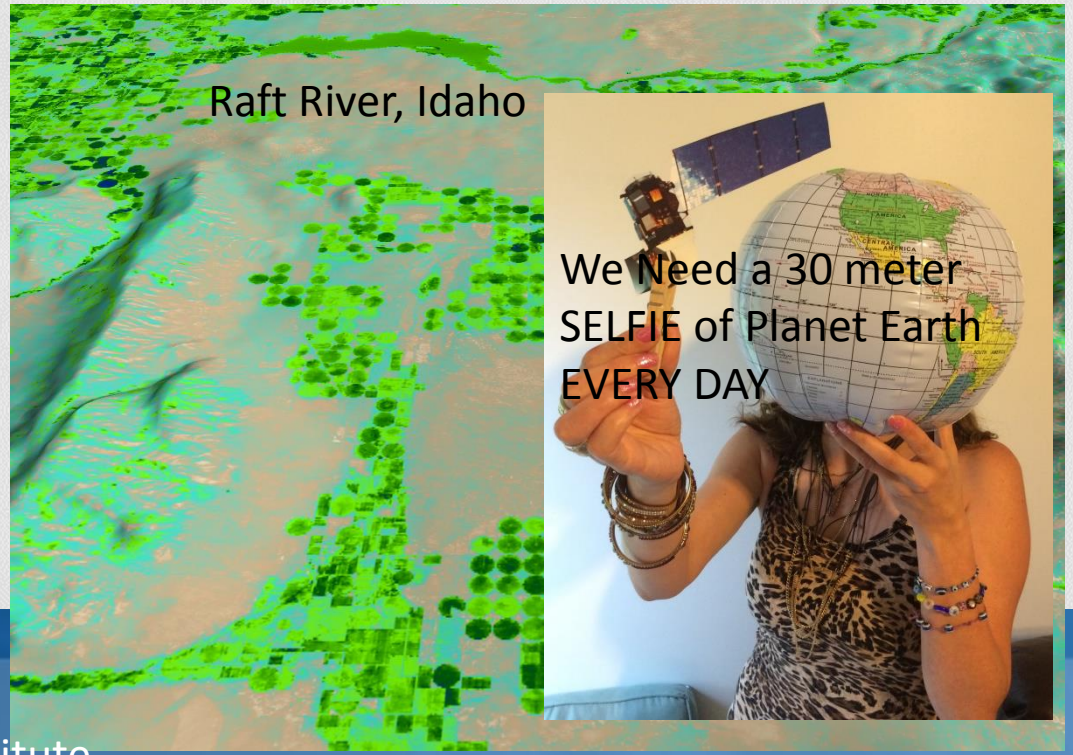
Specialization in Mapping Evapotranspiration at Parcel (field) scale using Thermal Imaging from Landsat

Landsat-based products are used in:

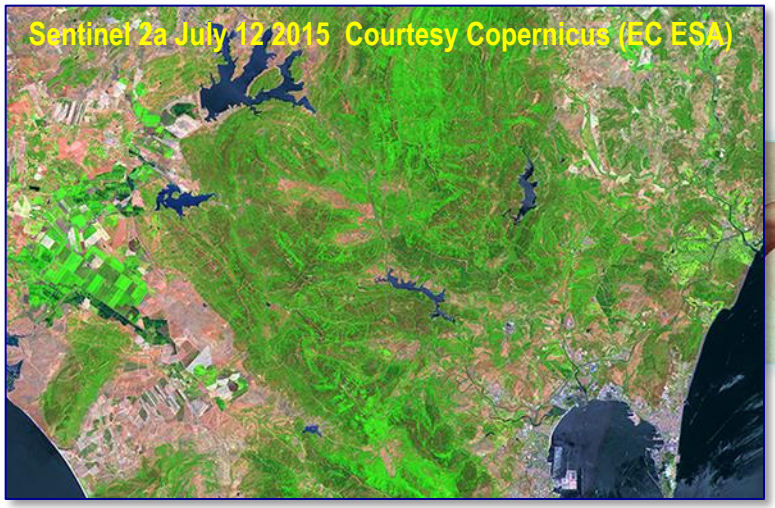
– Water Rights
– Water Transfers
– Hydrology
– US Supreme, State and District Court Cases

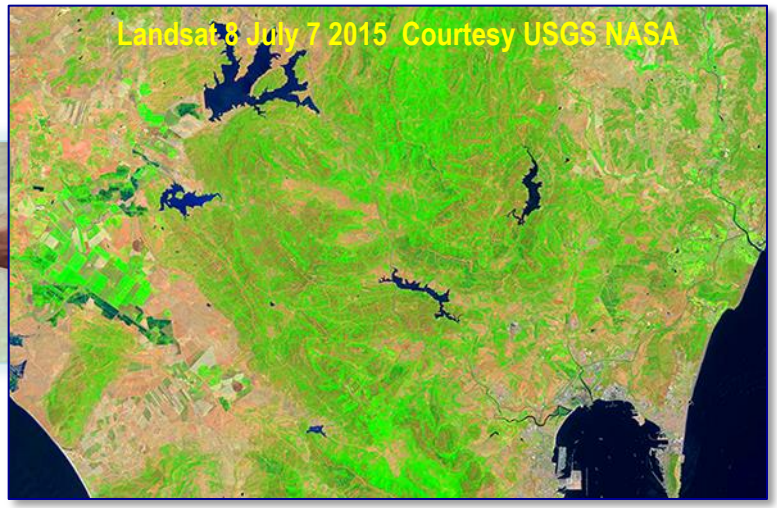
Needs:

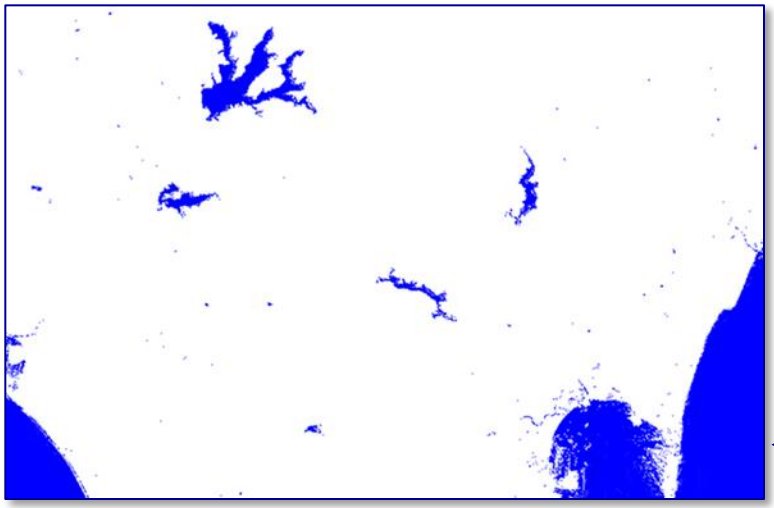
– More frequent revisit for thermal



Co-PI's: Dr. Ayse Kilic, Univ. Nebraska
Dr. Justin Huntington, Desert Research Institute



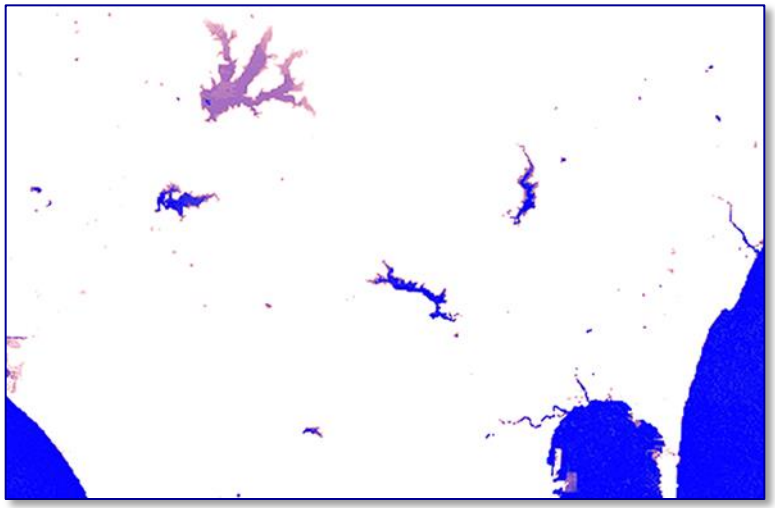




Global Surface Water mapping

2.8 million Landsat scenes

1 S2 scene



Alan Belward European Commission, Joint Research Centre,
Institute for Environment and Sustainability, Ispra (VA), Italy

Warren Cohen
USDA Forest Service
PNW Research Station
Corvallis, OR

- Roles in the agency and on the science team:
- Developing methods for monitoring forest change at the national to global scale
- Leveraging the full Landsat archive back to 1972
- Understanding the influences of management and climate change on forest health

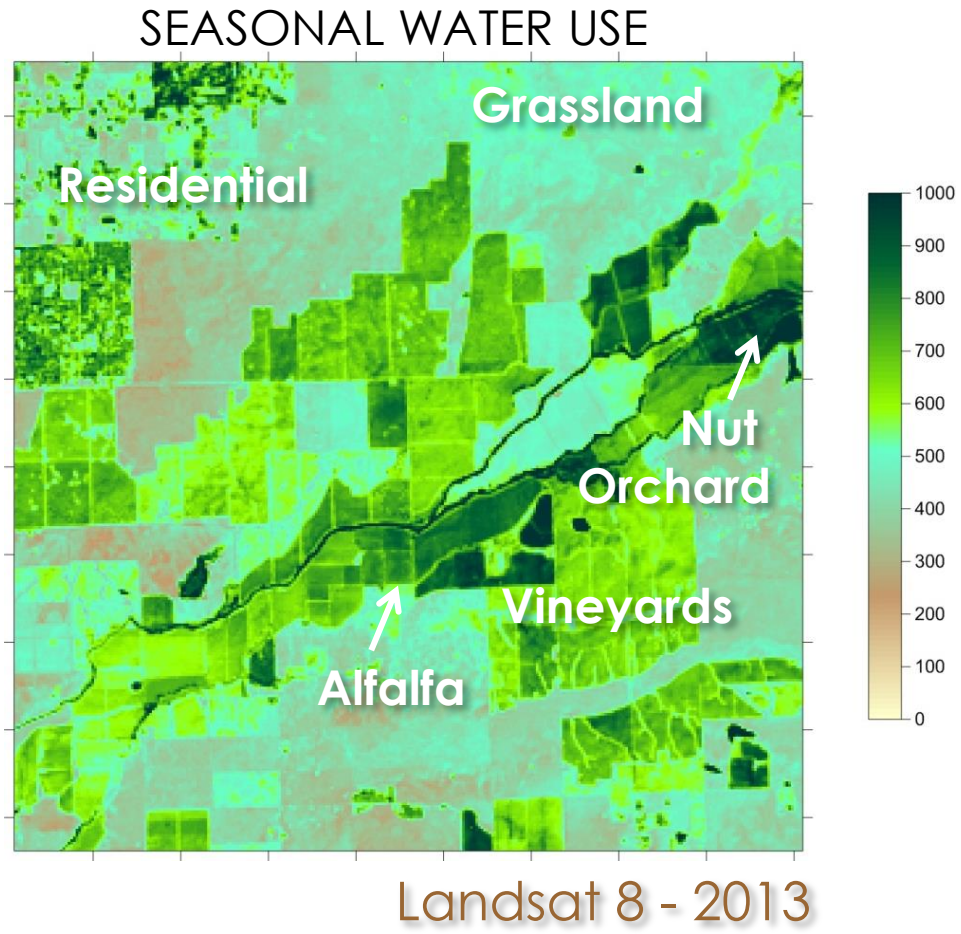
Feng Gao
Martha Anderson

Hydrology and Remote Sensing Laboratory
USDA-ARS
Beltsville, MD

Objective:

Fusing Landsat/MODIS/S2 imagery, develop 30m daily timeseries maps of phenology and water use/stress for improved crop monitoring, water management and yield estimation

Gallo Vineyards, Lodi CA



Dennis Helder

South Dakota State Univ. Image Processing Lab

- **Landsat Calibration Contributions**
  - Reflectance based calibration
  - Absolute Calibration using PICS
  - Atmospheric correction
  - Pseudo Invariant Calibration Sites
  - Vicarious calibration
  - OLI Rel/Absolute Gain
  - Landsat 8/Sentinel Cross Cal
  - DCC Cirrus band calibration
  - Landsat 7 Absolute Gain
  - L5 TM Absolute Gain
  - L4 TM Absolute Gain
  - MSS Absolute Gain
  - On-orbit MTF estimation
  - Artifact Char./Corr.
  - TM Short term (single orbit) temperature drift
  - TM Outgassing Model
  - TM/MSS Relative Gain Models

- **Purpose:** Radiometric, Geometric, and Spatial Characterization, Correction, and Calibration of Optical Satellite and Airborne Imaging Systems.

Integrating Field-Level Biophysical Metrics Derived from Landsat Science Products into a National Agricultural Data Warehouse

USDA RMA
Risk Management Agency

Jim Hipple, PhD -- USDA Risk Management Agency

Agency directed to use data mining and data warehousing technology to prevent fraud, waste and abuse in the US Crop Insurance Program

- enhance integrity of FCIC in compliance with 7 USC 1514 section 515(j)(2) of the Federal Crop Insurance Act (Agricultural Risk Protection Act, 2000)

- Landsat Science Team Role
- Evaluate and incorporate Landsat Science Products – surface reflectance, derived biophysical metrics into Agency data warehouse for data mining
- build temporal profile of key satellite derived parameters at the individual field level (mean, median, variability)
  - determine impact & influence of factors external to the crop insurance program (weather, crop quality, markets, public policy)
  - use this data and relevant data mining & statistical tools to decrease program vulnerability

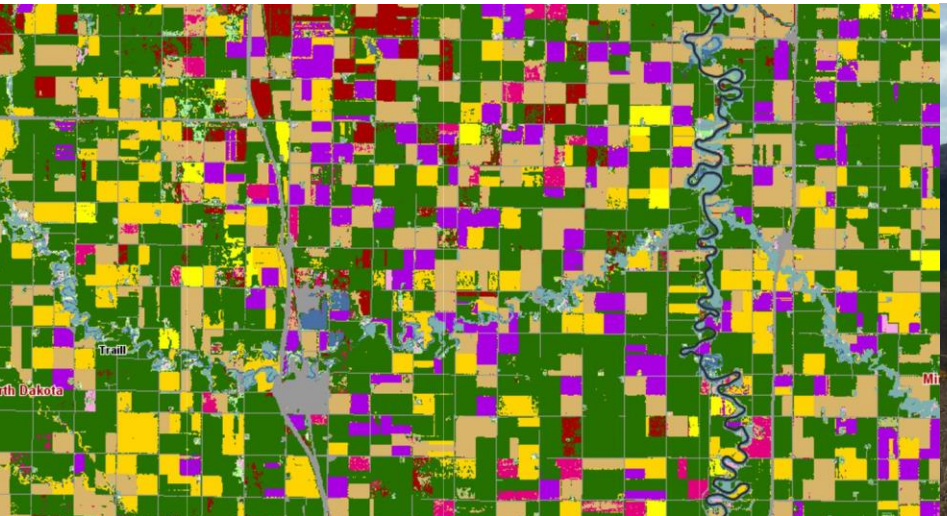
Operational monitoring of US croplands with Landsat

David M. Johnson

United States Department of Agriculture
National Agricultural Statistics Service

Evaluating Landsat 8 imagery for:

* use in CDL creation and crop acreage estimation
* agricultural disaster monitoring
* timeliness, acquisition simplicity, and ease of use
* ability of the new OLI and TIRS bands to improve crop type discrimination
* utility of the panchromatic band for land cover classification at 15 meters
* integration and/or comparison with other Landsat-like data sources (DMC, IRS)
* capacity to assess crop progress, condition and yield through temporal analysis
* comparison of near-time, nadir versus off-nadir collects over the same area.



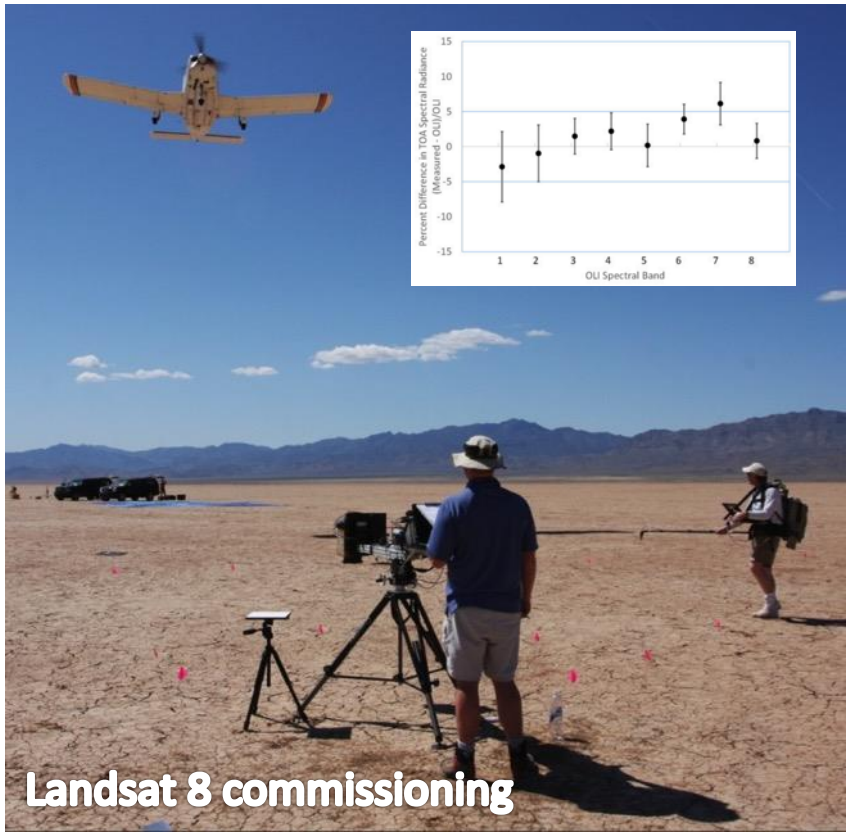
Joel McCorkel
NASA Goddard Space Flight Center

Interests

- Instrument model development
- Laser-based calibration
- Inter-calibration activities
- New measurements and missions

Activities

- CLARREO Pathfinder
- Landsat 9 TIRS-2 Calibration Lead
- GOES-R Flight Deputy Project Scientist
- JPSS Science and Calibration
- Science Teams (Landsat, Suomi NPP)

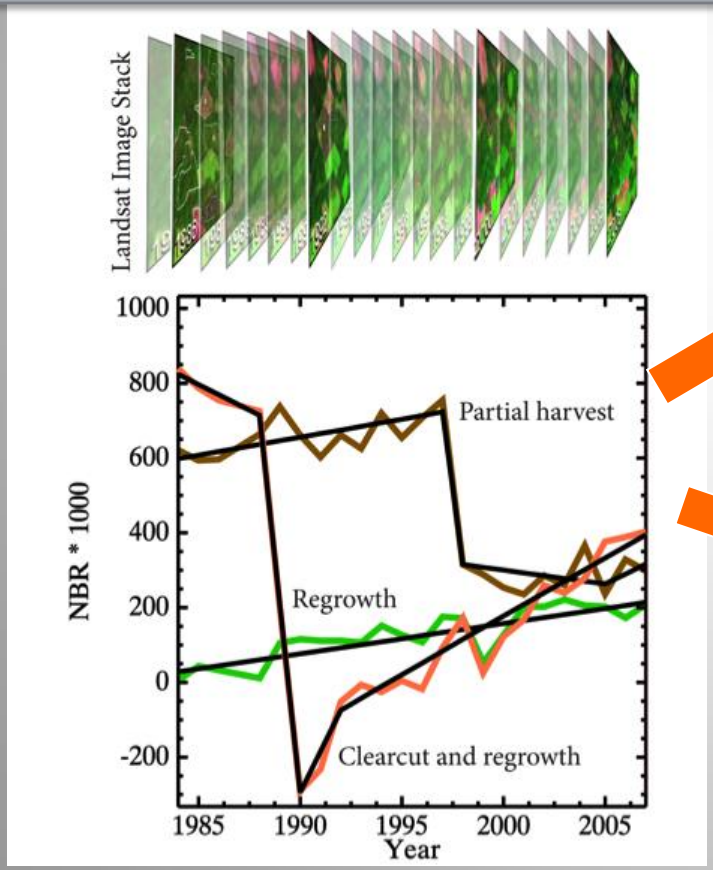


Using time-series approaches to improve Landsat's characterization of land surface dynamics

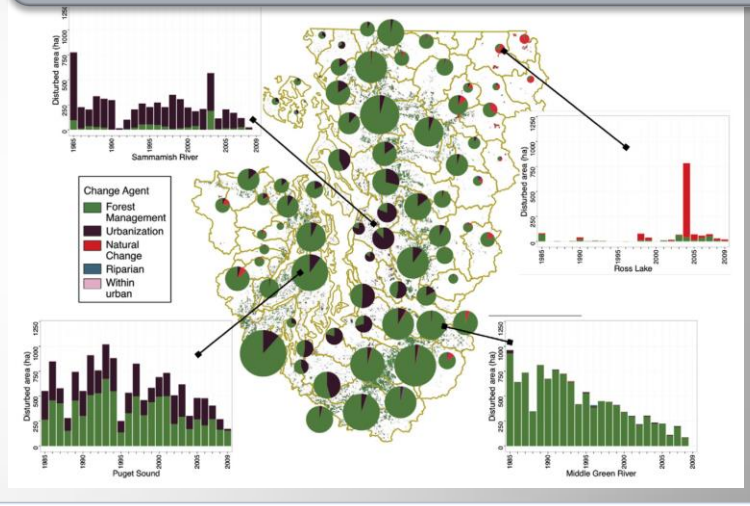
PI: Robert E Kennedy
Team: Joe Hughes, Tara Larrue, Sam Hooper

Oregon State University OSU | CEOAS College of Earth, Ocean, and Atmospheric Sciences

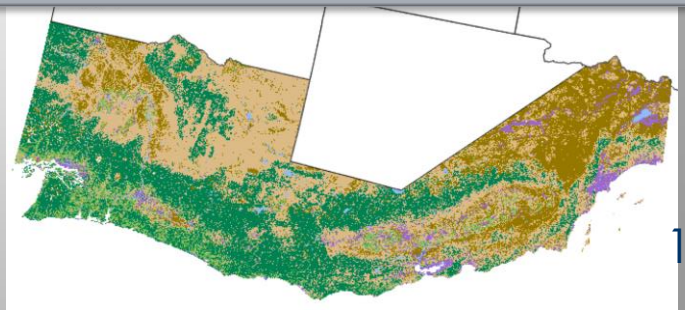
Distill archive to core processes



Describe landscape change



Describe landscape state



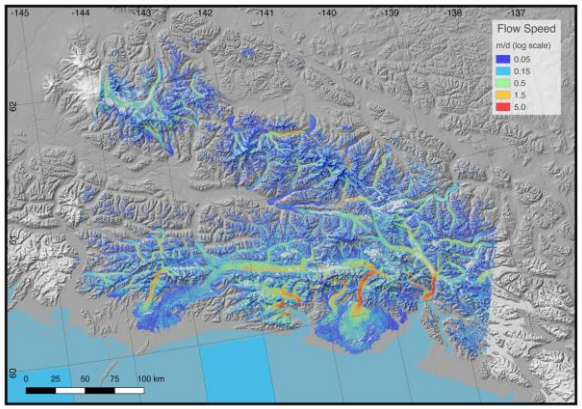
Cryospheric Applications of Landsat 8

National Snow and Ice Data Center

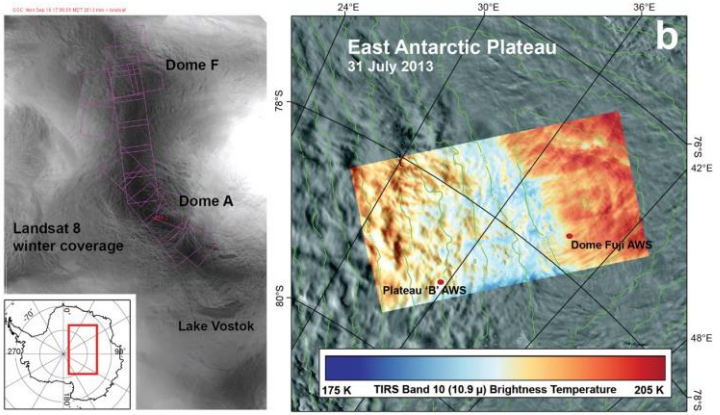
University of Colorado Boulder

Allen Pope,
on behalf of Ted Scambos

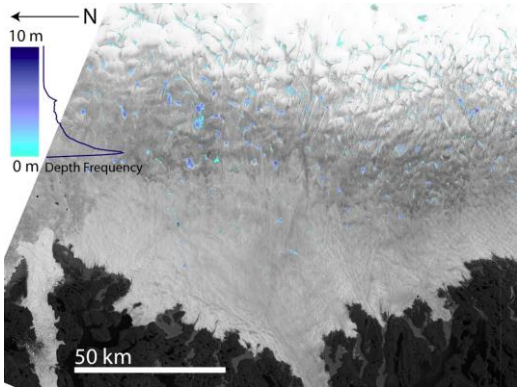
Global Ice Flow Mapping



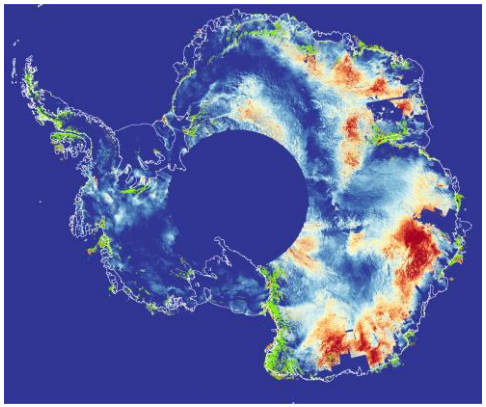
The Coldest Place on Earth



Greenland Hydrology



Antarctic Surface Roughness



Crystal Schaaf

Yanmin Shuai, ZhongPing Lee

Zhuosen Wang, Nima Pahlevan

University of Massachusetts Boston

Landsat 8 Science Team:
North American Land Surface Albedo and Nearshore Shallow-Bottom Properties from Coupled Landsat and MODIS/VIIRS

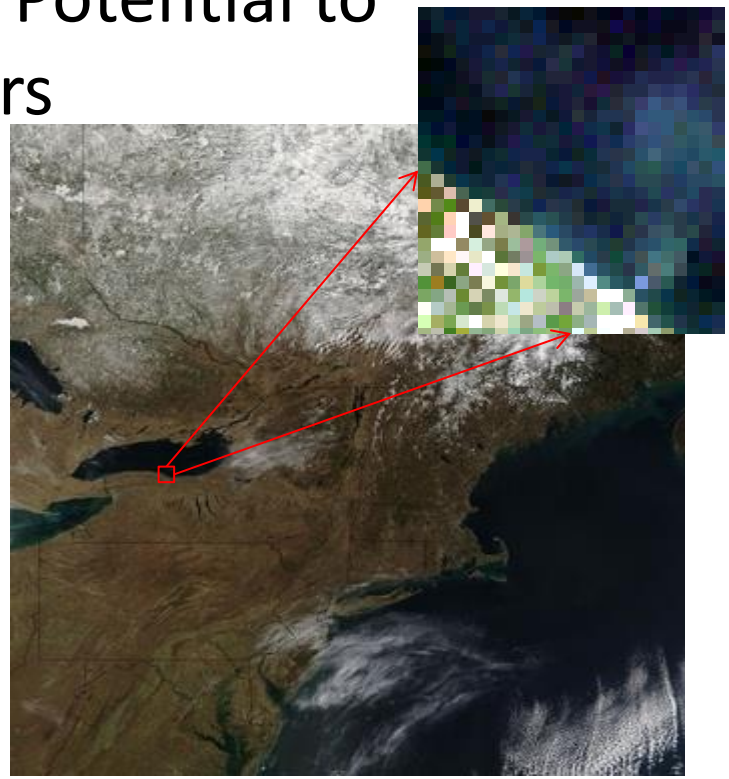
Also PI for Albedo Products
MODIS Science Team
VIIRS Science Team

Albedo describes percentage of Earth's incoming solar radiation which is reflected back out to space. An essential surface energy budget input for climate, hydrologic, and weather models, which varies as a function of land cover type, structure, and condition, water, soil moisture, snow cover and atmospheric state

Land/Water-Sat: Landsat's New Potential to Monitor Case 2 Waters

John R. Schott
Rochester Institute
of Technology

Landsat



The Past

Pahlevan, N. (2012), *An integrated physics-based approach to demonstrate the potential of the Landsat Data Continuity Mission (LDCM) for monitoring coastal/inland waters. (*Doctoral dissertation)

Concha, Javier A, (2015) *The Use of Landsat 8 for Monitoring of Fresh and Coastal Waters (*Doctoral dissertation)

Yongwei Sheng

- Background:
  - Title: Professor, UCLA Department of Geography;
  - Recent primary research interests: tracking lake dynamics at regional and global scales using multi-mission satellite data.
- LST-funded project:
  - Tittle: Developing decadal high-resolution global lake products from LDCM and Landsat archive;
  - Progresses:
    - Circa-2000 global lake database is now completed. In addition to its scientific value, the dataset would be beneficial to the operational scene-based Landsat water-mask product generation.
    - Circa-2015 global lake database is currently in the course of production using multi-temporal Landsat-8 images.

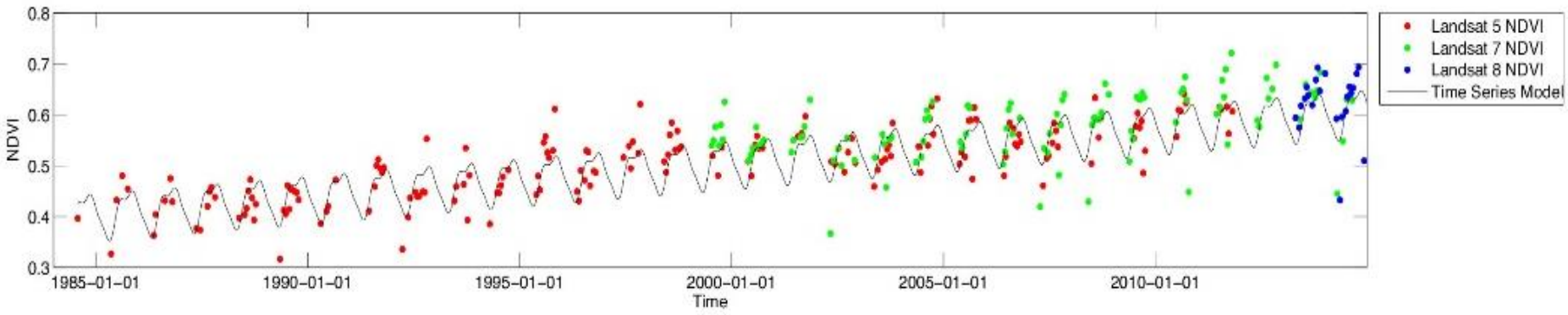
Monitoring 30+ Years of Gradual Change using Landsat Time Series Data

PI: Jim Vogelmann, Research Ecologist, USGS-EROS

Objectives: To assess gradual within-state land cover changes using Landsat time series data

What are gradual within-state changes? These are the types of changes that generally occur over long periods of time. These changes can be related to a variety of factors, such as climate, insects, drought, and vegetation growth. These types of changes are in contrast to rapidly-occurring land cover conversion events, such as logging or urbanization.

Why should we care? Such intra-state changes are ubiquitous, and can provide important clues regarding the health of our ecosystems.

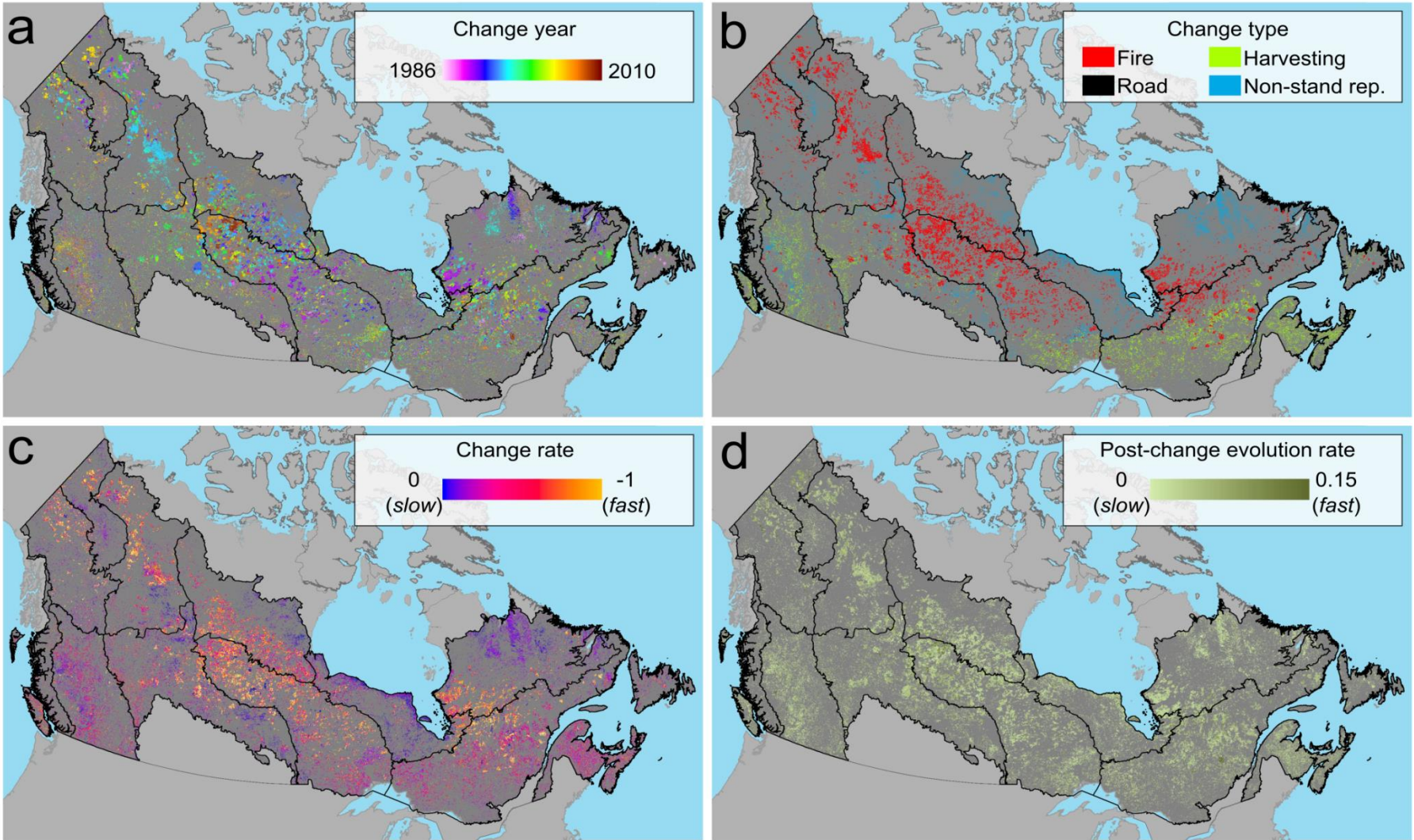


USGS

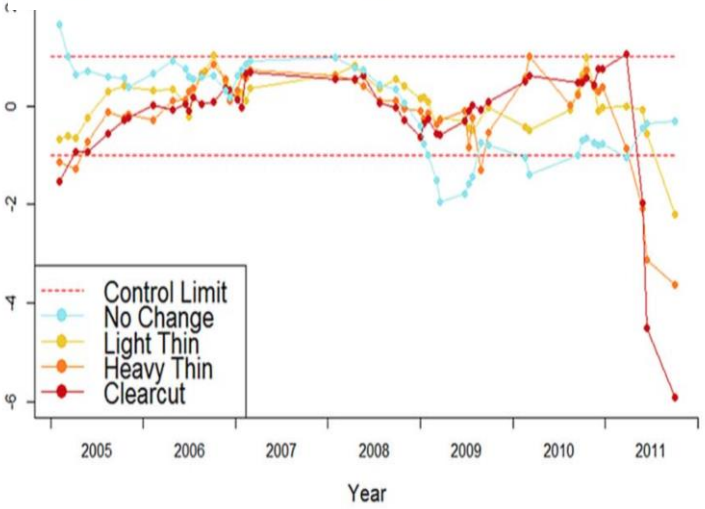
Example of gradual change in a forest observed using Landsat 5, 7 ad 8 data from 1985-2015. Upward NDVI trend is indicative of sustained growth.

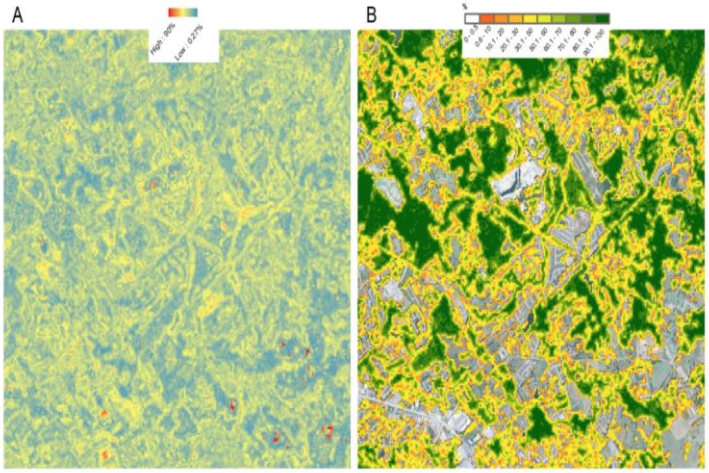
Mike Wulder – Canadian Forest Service

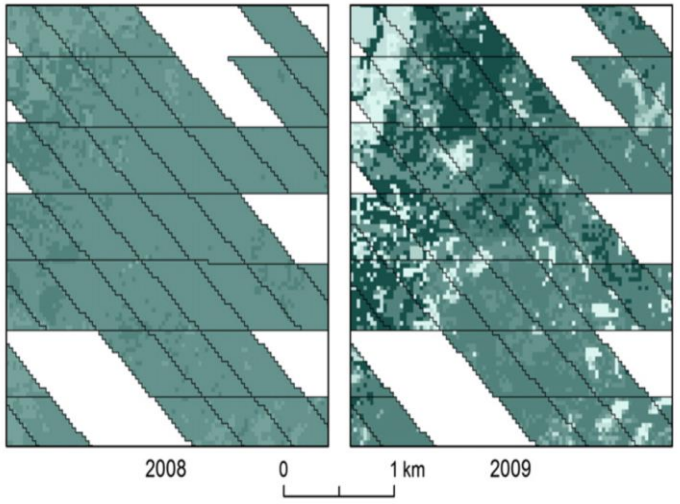
Recreating the history of Canada's forests using Landsat

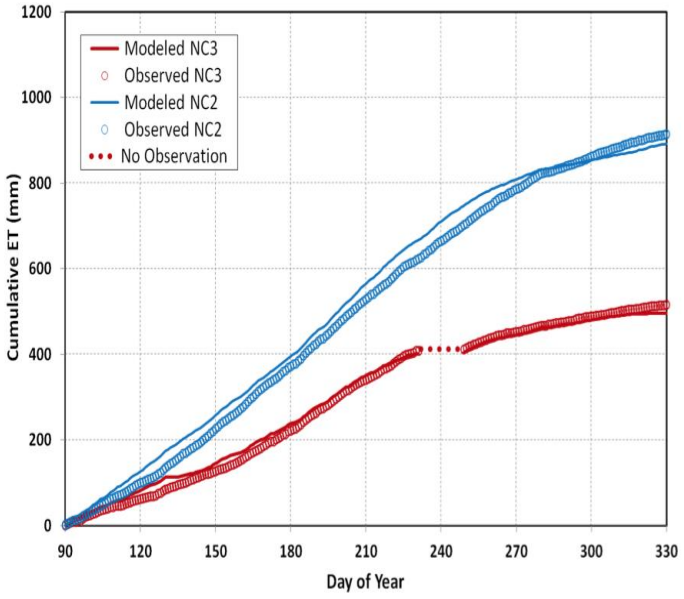


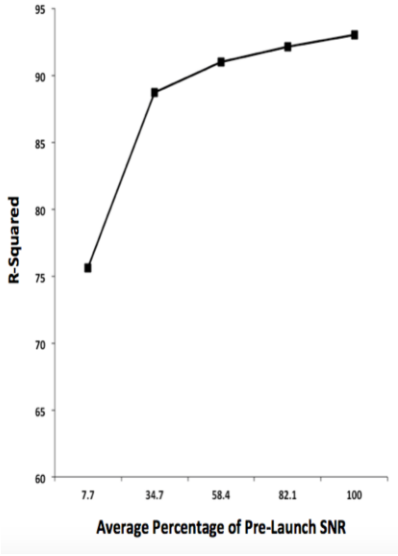
Randy Wynne and colleagues, Virginia Tech Making Multitemporal Work











Rick Lawrence

- Affiliation: AmericaView/Montana State University
- Through AmericaView, a national consortium of state-based consortia, seek to meet remote sensing needs on the local and state level
- Also, development and testing of remote sensing image classification approaches for moderate-resolution, multispectral data

LST Members Not Present

- Patrick Hostert, Humboldt University of Berlin
  - Land use change and multi-source change analysis
- Leo Lymburner, Geosciences Australia
  - Land change and image processing strategies
- Eric Vermote, NASA GSFC
  - Atmospheric correction and surface reflectance
  - Represented by Belen Franch and Jean-Claude Rogers